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the attacks of snails and browsing cattle. Our observations in the North African area, from Morocco to Egypt, on the edge of the Sahara in southern Algeria, and in Palestine, lead us to fully endorse the view of the Rev. Dr. Henslow, that in desert areas where plants are especially spiny or thorny, there are few snails, and a general absence of cattle. Over a century ago Pallas, and afterwards L. Regnier, in a paper published in 1792 (II., p. 101) in the very rare *Journal d'Histoire Naturelle*, edited by Lamarck and others, attributed the spiny growth of desert plants to the dryness of the soil. His observations appear to have been entirely overlooked by modern writers. A second article (p. 354), written by De Ramatuelle, is thoroughgoing in its evolutionary tone, barring perhaps the speculations as to the origin of the spines from 'germes particuliers.'

Professor Beecher's splendid discovery of the nature of the appendages of trilobites and of other important points in their anatomy has entitled him to the lasting gratitude both of paleontologists and zoologists. This reprint of his original papers and illustrations is very opportune. It is possible, however, that the last word has not been said as to the nature of the larval trilobites or as to the position of the trilobites in nature. How the protaspis stage of trilobites can be likened to the nauplius of crustacea, and why trilobites should be placed among crustacea, we do not understand. That the presence of antennæ necessarily obliges us to regard trilobites as crustacea, when all the succeeding appendages of the body are of the same general type, not being differentiated into specialized mandibles, maxillæ, maxillipedes, thoracic and abdominal legs, as they are in Crustacea, including the Phyllopoda (though in them the appendages of the trunk are alike), does not seem logical. We would prefer to regard the trilobites, merostomes and Arachnida as members of a phylum quite distinct from that of the Crustacea. Is it not probable that the rather artificial phylum of Arthropoda will eventually have to be divided into three phyla? The resemblances in trilobites to Crustacea seem to us to be a case of convergence. The

papers on Brachiopoda are likewise of great interest and value, and are crowded with valuable suggestions. The line of thought is largely based on the work of the late Dr. A. Hyatt, whose philosophical and scholarly methods have had such a happy and fruitful influence on the new generation of paleontologists.

A. S. PACKARD.

SOCIETIES AND ACADEMIES.

THE AMERICAN PHILOSOPHICAL SOCIETY.

THE scientific program of the general meeting to be held next week is as follows:

Thursday, April 3, 10:00 o'clock.

'The President's Address': Gen. ISAAC J. WISTAR.

'Origin of the Oligocene and Miocene Deposits of the Great Plains': Professor JOHN B. HATCHER, of Pittsburg.

'The Upper Cretaceous and Lower Tertiary Section of Central Montana': Mr. EARL DOUGLASS, of Princeton.

'Evolution and Distribution of the Proboscidea in America': Professor HENRY F. OSBORN, of New York.

'On South American Mammals': Professor WILLIAM B. SCOTT, of Princeton.

'The Mammals of Pennsylvania and New Jersey': Mr. SAMUEL N. RHOADS, of Audubon, N. J.

'The Identity of the Whalebone Whales of the Western North Atlantic': Dr. FREDERICK W. TRUE, of Washington.

Afternoon Session, 2:00 o'clock.

'On the Molluscan Fauna of the Patagonian Formation': Dr. H. VON IHERING, of São Paulo, Brazil.

'A Comparison Between the Ancient and Recent Molluscan Fauna of New England': Professor EDWARD S. MORSE, of Salem, Mass.

'Distribution of Fresh Water Decapods and its bearing upon Ancient Geography': ARNOLD E. ORTMANN, Ph.D., of Princeton.

'Systematic Geography': Professor WILLIAM MORRIS DAVIS, of Cambridge, Mass.

'On Drift Casks in the Arctic Ocean': Mr. HENRY G. BRYANT, of Philadelphia.

'The Isthmian Canals': Professor LEWIS M. HAUPT, of Philadelphia.

*8:00 o'clock at the Free Museum of Science
and Art.*

'The Relation of the American University to Science': President HENRY S. PRITCHETT, of Boston.

'The Advancement of Knowledge by the Aid of the Carnegie Institution': President DANIEL C. GILMAN, of Baltimore.

Friday, April 4, 10:00 o'clock.

'Historical Investigation of the Supposed Changes in the Color of Sirius since the Epoch of the Greeks and Romans': T. J. J. SEE, Ph.D., of Washington.

'Recent Progress in the Lunar Theory': Professor ERNEST W. BROWN, F.R.S., of Haverford, Pa.

'On a New Method of Transiting Stars': Professor MONROE B. SNYDER, of Philadelphia.

'On the Evolution of Martian Topography': Mr. PERCIVAL LOWELL, of Flagstaff, Arizona.

'Results of Observation with the Zenith Telescope at the Sayre Observatory': Professor CHARLES L. DOOLITTLE, of Philadelphia.

'On the Spectra of Gases at High Temperature': Professor JOHN TROWBRIDGE, of Cambridge, Mass.

'On Some Equations pertaining to the Propagation of Heat in an Infinite Medium': Professor A. STANLEY MACKENZIE, of Bryn Mawr, Pa.

Afternoon Session, 2:00 o'clock.

'The Direction of Evolution in Color-Marks in Rock Pigeons': Professor CHARLES O. WHITMAN, of Chicago.

'On Biological Heredity and Organic Evolution': Professor GIUSEPPE SERGI, of Rome, Italy.

'Is Scientific Naturalism Fatalism?' A one-minute paper: Professor WILLIAM KEITH BROOKS, of Baltimore.

'On *Dichotoma*, a new genus of Hydroid Jelly-Fish': Professor WILLIAM KEITH BROOKS, of Baltimore.

'On the Continuity of Protoplasm': Professor HENRY KRAEMER, of Philadelphia.

'Further Experiments on the Physiological Action of Ions': Dr. JACQUES LOEB, of Chicago.

'The Embryology of a Brachiopod': Professor EDWIN GRANT CONKLIN, of Philadelphia.

'Relationship of the Gordiacea': Professor THOMAS H. MONTGOMERY, JR., of Philadelphia.

'The Spermatogenesis of *Oniscus Asellus* Linn., with especial reference to the history of the Chromatin': M. LOUISE NICHOLS, Ph.D., of Philadelphia.

Saturday, April 5, 10:00 o'clock.

'The International Catalogue of Scientific Literature': CYRUS ADLER, Ph.D., of Washington.

'A Classification of Economics': Professor LINDLEY MILLER KEASBEY, of Bryn Mawr, Pa.

'Experiments on Cytolysis': Professor SIMON FLEXNER, of Philadelphia.

'On Osteitis Deformans': Professor JAMES C. WILSON, of Philadelphia.

'The Influence of Acute Alcoholic Intoxication upon Certain Factors involved in the Phenomena of Hæmolysis and Bacteriolysis': Professor A. C. ABBOTT, of Philadelphia.

'Blindness from Congenital Malformation of the Skull': CHARLES A. OLIVER, M.D., of Philadelphia.

'Race Elements in American Civilization' (illustrated by German Examples): Professor M. D. LEARNED, of Philadelphia.

THE AMERICAN ELECTRO-CHEMICAL SOCIETY.

ARRANGEMENTS for the first general meeting of the American Electro-chemical Society, to be held at Philadelphia on April 3, 4 and 5, are as follows:

Thursday afternoon, April 3, 2 P.M. Visits to places of interest.

Thursday evening, April 3, 8 P.M., at the Manufacturer's Club, inaugural meeting. This meeting will be devoted to the organization of the Society, adoption of a constitution and by-laws, election of officers, determining times and places of future meetings, discussing the question of publishing the transactions, etc.

Friday morning, April 4, 9 A.M., at the lecture hall of the John Harrison Laboratory of Chemistry of the University of Pennsylvania. Reading and discussion of the following papers:

'A University Course in Electro-chemistry': Professor JOSEPH W. RICHARDS, Ph.D., Lehigh University, Bethlehem, Pa.

'Electrodes': CLARENCE L. COLLINS, 2d, Niagara Falls, N. Y.

'Note on the Gladstone Tribe Couple': Professor WILDER D. BANCROFT, Ph.D., Cornell University, Ithaca, N. Y.

'The Nascent State': C. J. REED, Philadelphia, Pa.

'The Electrolytic Reduction of Lead': PEDRO G. SALOM, Ph.D., Philadelphia, Pa.

'Electrodeless Conduction in Electrolytes':
CARL HERING, Philadelphia, Pa.

'On the Electrolysis of Sodium Nitrate and the Composition of the Developed Gases': C. W. VOLNEY, Ph.D., Keyport, N. J.

Professor CHAS. A. DOREMUS, M.D., Ph.D.,
Subject to be announced.

Friday afternoon, April 4, 2 P.M., at the
John Harrison Laboratory.

'Current Electro-chemical Theories': Professor
LOUIS KAHLBERG, Ph.D., University of Wisconsin,
Madison, Wis.

'A Zinc-Bromine Storage Battery': HERBERT
H. DOW, Midland, Mich.

'Continuous Electrolysis of Solutions of
Metals': N. S. KEITH, Ph.D., New York City.

'A Method of Electrolytic Production of Zinc
from its Ores': SAMUEL S. SADTLER, Philadelphia,
Pa.

'The Electrolytic Rectifier': Professor C. F.
BURGESS, University of Wisconsin, and CARL
HAMBUECHEN, Madison, Wis.

'On the Relative Speed of the Ions in Solutions
of Silver Nitrate in Pyridine and Aceto-nitrile':
HERMAN SCHLUNDT, Ph.D., Madison, Wis.

'Fall of Potential in Electrolytes': CARL HER-
ING, Philadelphia, Pa.

'Caustic Alkalies and Chlorine by the Dry
Electrolytic Process': CHAS. E. ACKER, Niagara
Falls, N. Y.

Friday evening, April 4, after 8 P.M., at the
Manufacturer's Club, 1409 Walnut Street.
Informal reception.

Saturday morning, April 5, 9 A.M., at the
John Harrison Laboratory. Reading and
discussion of the following papers:

'On a New Type of Electrolytic Meter': KON-
RAD NORDEN, Ph.D., New York City.

'The Reversible Copper Oxide Plate': WOOLSEY
McA. JOHNSON, Hartford, Conn.

'A Thermodynamical Note on the Theory of the
Edison Battery': E. F. ROEBER, Ph.D., Philadel-
phia, Pa.

'Electrolysis of an Aqueous Solution by Alter-
nating Current': Professor JOS. W. RICHARDS,
Ph.D., Lehigh University, Bethlehem, Pa.

'The Atom of Electro-chemistry': ARVID
REUTERDAHL, Providence, R. I.

Saturday afternoon will be devoted to visits
to places of interest.

THE GEOLOGICAL SOCIETY OF WASHINGTON.

At the meeting of the Society on February 26, the first paper, by Mr. T. W. Vaughan, was entitled 'Earliest Tertiary Coral Reefs in the Antilles and United States.' Mr. Vaughan made a few remarks in order to indicate when, during Tertiary time, the physical conditions in the regions mentioned in the title of his communication first became suitable for the formation of coral reefs. A few species of reef-building genera occur in the Midway (basal Eocene) beds of Alabama, and taken as a whole the Eocene corals of the United States characterize only moderately deep or shallow water; but strictly speaking, no Eocene coral reefs are known in the United States. Reef-building genera occur in the Vicksburgian (Lower) Oligocene at Vicksburg, Mississippi. The temperature of the water was at least sub-tropical and the depth was not great, probably not too great for the formation of reefs; but some other condition, probably such as muddiness of water, prevented their formation. The Coral limestone at Salt Mountain, Alabama, is a coral reef limestone, but its precise stratigraphic position has not been determined. It is either uppermost Lower Oligocene or basal Upper Oligocene. The Upper Oligocene in the United States was initiated by an extensive development of coral reefs. They occur in southwestern Georgia along the Flint River, the Tampa silex beds of Tampa, Florida, and at numerous other localities in Florida. The fauna is rich in genera, species and individuals. Reefs of the same age are very abundant in the Antilles. They occur in Cuba in the vicinity of Havana, Matanzas, Santiago and other places. They probably are present in the island of Haiti. Other islands in which Upper Oligocene rocks exist are Porto Rico, Antigua and Arube (Dutch West Indies).

There are no Miocene coral reefs in the United States, the temperature of the water being too cold. The species of corals known grew in water only a few fathoms in depth. It is not at present known whether or not Miocene reefs existed in the West Indies. Apparently during Miocene time the Antilles stood much higher than at present; therefore

if any did exist they would at present be submerged.

Pliocene reefs were extensively developed along the Florida coast, for instance, along the Caloosahatchee River. The genera of the Pliocene corals are the same as those at present living in the Floridian and Antillean seas, but often there are appreciable specific differences between the Pliocene and recent representatives of the same genus.

Mr. Bailey Willis spoke on the 'Conditions of Overthrust in the Northern Rockies.' After restating the facts relating to the overthrust of Algonkian strata upon Cretaceous with a displacement of more than seven miles, along the eastern flank of the northern Rocky Mountains in northwestern Montana, Mr. Willis presented a hypothesis of origin and development of this structure. It is assumed that in Cretaceous time Algonkian strata in this region were essentially flat, and in consequence of subsidence were buried under Dakota and Pierre sediments, with a shore line not far from the position of the present mountain range. Algonkian strata beneath the marine area being depressed and beneath the land area being raised, they were bent parallel to the general trend of the shore. When later the strata were compressed, the initial bend determined an anticline in this same position. Erosion of the arch cut deeply into Algonkian beds and left the edges exposed and free to move. Continued compression resulted in their being thrust upward and northeastward upon the eroded surface, until Algonkian limestones came to rest upon Cretaceous areas. The structure closely resembles the Rome fault, Georgia. The date of development is inferred to have been early Tertiary.

Mr. F. E. Matthes presented a paper on 'Glacial Erosion in the Northern Rockies.' The range was shown to have been deeply dissected before the advent of the glaciers. The valleys were nearing maturity and had low gradients; the glaciers which subsequently occupied them had therefore but little fall from their sources to their distal ends. They moved slowly and were of considerable thickness. The lengths of the various trunk

glaciers were small in proportion to the large névé areas which they drained.

The frequent occurrence of many valleys radiating from one point was shown on the map. The effect of this arrangement upon the valley glaciers was shown to have been a general retardation of their flow and a consequent increase in thickness above their junction. Some attained a thickness of over 3,000 feet in some parts of their course.

The radiating system of ravines at the heads of valleys was shown to be particularly favorable to the development of cirques. At least two sets of cirques at different elevations are found in these mountains, indicating oscillations of the névé line to as low as 6,000 feet altitude.

The definitions of the snow line as given in three text-books now in use were compared and found to be greatly at variance with each other. A new definition was favored in which the topographic element is given due weight, and which makes the snow line virtually coincident with the névé line as found on glaciers.

The tendency of glaciers to flatten the grades of their channels, beginning at the upper ends, was shown to be productive of the step-like profiles of glaciated valleys. The cause of this tendency was sought in certain motions in the interior of the glaciers, the explanation of which was not attempted.

The widening of the valleys by cliff recession was emphasized as an important factor in producing discordance between valleys. Discordance was shown to be produced by (1) deepening of main valley, (2) widening of main valley; and to be diminished by (3) deepening of side valley. Cases were pointed out on the contour maps of valleys meeting with discordances ranging between 300 and 1,500 feet; also of several meeting with perfect accordance. Nor were the discordances always in inverse ratio to the drainage areas of the respective valleys.

The conclusion was reached that in no case could the discordance of a side valley be taken as a measure of the deepening of the main valley.

ALFRED H. BROOKS,
Secretary.

NEW YORK ACADEMY OF SCIENCES.

PUBLIC LECTURE.

ON February 26 a public lecture was presented under the auspices of the Section of Biology, by Professor Bashford Dean, of Columbia University, entitled 'Journeys of a Naturalist through Japan and the Philippines.'

Professor Dean referred to the zoological relations of the Japanese archipelago with the adjacent continent on the one hand, and with the island series on the other—*i. e.*, (1) the Aleutian, (2) through the Bonin Islands with the region of New Guinea, and (3) through the Liu Chiu Islands with Formosa and the Philippines. The importance of the line of Blakiston separating the Hokkaido from the southern islands was emphasized.

Especial attention was called to the favorable facilities for zoological work which are offered in the region of Misaki, near the mouth of the Bay of Tokyo, and to the work of the Marine Laboratory of the Imperial University in this region. Dr. Dean had an opportunity of examining the centers of animal artificialization, an art in which the Japanese have been so eminently successful. Especially praiseworthy is the method of oyster-culture practiced in the Inland Sea near Hiroshima; hardly less interesting were the establishments in which varieties of gold fish are propagated; and even more striking were those for the cultivation of the breed of Tosa fowls, in favorable specimens of which the tail feathers attain the great length of fifteen feet. Success in the maintenance of this breed appears to be due to the selection of those fowls in which moulting occurs irregularly, and the effort is made to entirely suppress the moult in that region of the fowl where long feathers are to be produced. In referring to a journey in the Philippines, Professor Dean described many interesting experiences, particularly those at Maujuyod, where living specimens of *Nautilus* were obtained.

HENRY E. CRAMPTON,
Secretary.

THE ACADEMY OF SCIENCE OF ST. LOUIS.

At the meeting of the Academy of Science of St. Louis on the evening of February 17, Dr. Gellert Alleman, of Washington University, delivered an address on 'The Chemical Constitution and the Manufacture of Portland Cements.' The growth of the cement industry was treated, the various steps of development being shown by lantern slides illustrating past and present types of machinery employed in its manufacture. Several slides were shown giving tabulated results of a number of analyses of different commercial Portland cements.

Mr. Charles Espenschied read a letter from Mr. Seymour Carter, of Hastings, Minnesota, in which was described a method of Professor Anderson, of Columbia University, by which it was stated that cereals could be directly transformed to food-stuffs. The process consists of enclosing the cereal to be treated in a hermetically sealed vessel and subjecting it to a temperature of about 450° F. for a certain time, and immediately thereafter opening the vessel, when it is found that the grains expand to six or eight times their normal size. The inventor states that the process does not alter the composition of the cereal. Samples of several cereals treated in this manner were shown.

Two persons were elected to active membership.

WILLIAM TRELEASE,
Recording Secretary.

THE TORREY BOTANICAL CLUB.

At the meeting of the Club on January 29, the first paper was by Dr. Britton, entitled, 'Notes on the Crassulaceæ,' and is to appear in print, being a part of a contribution toward the projected 'Systematic Botany of North America.' Remarks followed by Dr. C. C. Curtis, Dr. Rydberg, Dr. Small, Dr. MacDougal and Mrs. Britton. The distribution of the Crassulaceæ was commented on, Dr. Britton speaking of the isolated colonies of high mountain species, which seem to have been continuously highly interbred, so producing highly specialized species.

The second paper, by Mr. F. S. Earle, entitled, 'New Genera of Fungi,' founded on rep-

representatives from California and New Mexico, will soon appear in the *Garden Bulletin*.

Dr. Earle also exhibited a rosebush from under glass at the Garden, the roots of which have been attacked by a fungus now under examination and cultures of which were exhibited. The mycelium was abundant in the fibrous roots; also in the bark and cambium immediately above ground, and had caused sudden yellowing and dropping of the leaves.

Dr. MacDougal recalled the suggestion that potatoes are the result of fungal infection of the underground stem; it is said that no one has ever examined a potato tuber without finding fungus traces in it. In many cases of precocious blooming among both wild and cultivated plants, the cause is stimulus from similar infection.

Dr. MacDougal also exhibited specimens of two remarkable Alpine xerophytes from an altitude of 4,000 feet on New Zealand mountains, known as vegetable-sheep, *Raoulia* and *Haastia*, composites between which belongs *Gnaphalium* in order of affinity.

Dr. Rydberg spoke of a Rocky Mountain phlox with similar growth in cushion-like masses.

Mrs. Britton reported on the progress of her studies of a *Vittaria* collection made by Dr. Britton at St. Kitts, and exhibited drawings, and the present indication that two different specific names have been in use for different stages of the same life-history.

EDWARD S. BURGESS,
Secretary.

THE NORTHEASTERN SECTION OF THE AMERICAN CHEMICAL SOCIETY.

The regular monthly meeting of the Section was held on February 27 in the physics lecture room of the Massachusetts Institute of Technology, Professor L. P. Kinnicutt presiding. Professor Henry P. Talbot addressed the Society on 'The Recorded History of the Members of the Argon Group.' The general history, the methods of isolation and identification of these gases, together with their physical properties, and their position in the periodic system were all carefully reviewed up to the present time.

HENRY FAY,
Secretary.

THE ONONDAGA ACADEMY OF SCIENCE.

The Academy met in the historical rooms in Syracuse on Friday, Feb. 21, 1902. Dr. W. M. Beauchamp gave the presidential address on the 'Peopling of Early America.' He gave a résumé of the early investigations, touching briefly on the different theories proposed, and emphasizing the fact that the answer to the problem lies in the researches into the languages, customs and manners of the present nations and the archeological remains. Dr. Beauchamp gave many interesting items from his extended observations on the native tribes of New York State.

T. C. HOPKINS,
Corresponding Secretary.

DISCUSSION AND CORRESPONDENCE.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE: ANTHROPOLOGY.

THE fifty-first meeting of the American Association for the Advancement of Science will be held at Pittsburgh, Pa., on June 28 and July 3, 1902. Mr. Stewart Culin, of the University of Pennsylvania, will preside over the Section of Anthropology.

Anthropologists are cordially invited to attend and contribute papers upon subjects connected with their fields of research. Several members of the Section have informally expressed the desire that some special effort should be made by the museum and field workers of the Section to present papers on the collections of importance with which they are familiar.

In order that a preliminary sectional program may be distributed in advance of the meeting, titles of communications should be sent to the secretary as soon as possible. Abstracts of papers, or the papers themselves, may be sent later at the convenience of the authors, who are reminded that no title will appear in the final program until the paper, either in full or in abstract, has been passed upon by the sectional committee.

HARLAN I. SMITH,
Secretary of Section H, Anthropology.
AMERICAN MUSEUM OF NATURAL
HISTORY, NEW YORK.